Technical Sessions : A - 05

Acute and subacute toxicity studies of the ethyl acetate soluble proanthocyanidins of immature inflorescence of *Cocos nucifera* L. in Wistar rats

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The coconut palm, *Cocos nucifera* L. is a member of the monocotyledonous family, Arecaceae and mainly grows in tropical coastal areas. Ayurvedic and traditional medical practitioners of Sri Lanka use the decoction of the immature inflorescence of *Cocos nucifera* L. (IC) variety aurantiaca for the treatment of menorrhagia. The extraction, purification, and characterization of ethyl acetate soluble proanthocyanidins (EASPA) of IC have previously been reported. Furthermore, the progestogenic effect of EASPA at the dose level of 3.5 mg/kg body weight in female rats has also been reported.[1] This finding is very significant as progestogens are widely used in the treatment of menorrhagia in western medicine. Acute and subacute toxicity studies of EASPA of the IC carried out using female Wistar rats according to Organization for Economic Co-operation and Development (OECD) guidelines 423[2] and 407[3], respectively is reported herein. In the acute toxicity study, a single dose of EASPA (2000 mg/kg body weight) was orally administered to rats and monitored for 14 days. In the subacute toxicity study, rats were orally administered with EASPA daily for 28 days at doses of 1.75, 3.5, 7 and 14 mg/kg body weight and observed for 28 days.

No rat in either the acute or subacute toxicity study exhibited mortality, signs of toxicity (changes in the skin, fur, eyes, mucus membranes, respiratory depression) and behavioral changes (salivation, diarrhea, sleep, coma, lethargy). Furthermore, these rats did not show any significant change in their mean body weight and food and water intake. There was no significant difference in haematological [red blood count (RBC), haemoglobin (Hb), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC), platelet count, white blood count (WBC), lymphocyte, monocyte, basophil and neutrophil] and biochemical (alkaline phosphatase (ALP), alanine aminotransferase (ALT), urea, glucose and cholesterol) parameters of blood samples in treated rats of both toxicity studies with compared to control rats. Macroscopic examination of internal organs in rats of all test groups in both acute and subacute toxicity studies did not show any change in color and texture compared to the control group rats during necropsy. Histopathological examinations of internal organs of rats in all test groups in both toxicity studies showed a normal cellular architecture and were similar to those of the control group rats.

Since there were no deaths or signs of toxicity in treated rats during the acute toxicity study, it is possible to suggest that the LD_{50} of EASPA is greater than 2000 mg/kg body weight via oral route. Observations made during the subacute toxicity study suggest that the long term intake (28 days) of EASPA at tested dose levels including the therapeutic dose do not induce any toxic effects in treated rats in comparison to control group rats. These results will be useful in the development of a novel therapeutic agent from EASPA of the IC for the treatment of menorrhagia, which incapacitates a considerable proportion of women worldwide.

Keywords

Cocos nucifera L., progestogenic effect, acute toxicity, subacute toxicity

References

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Technical Sessions : A - 06

Enhancement of crop productivity of red onion using tea-waste biochar as a soil amendment

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Biochar (BC) is a low cost adsorbent produced by the pyrolysis of biomass which can be used for agricultural purposes. Tea waste is an excellent biomass for BC production since it is an abundant solid waste in Sri Lanka. The presented work was carried out to study the impact of BC as a soil amendment on the quality of Kalpitiya soil and the crop productivity within a time period of 3 months. Soil was collected from 3 different sites located at Kalpitiya during October for the greenhouse experiment where the particle size was ranged below 1 mm. Tea waste was slow pyrolyzed in a muffle furnace at 300, 500 and 700 °C. Column study at a flow rate of 2 – 3 mL/min was carried out to determine the direct effect by 500 °C BC. Although a significant direct effect was not observed by other nutrients, the direct contribution of potassium by BC was noteworthy. A volume of 1500 mL was used to minimize the amount of potassium that was directly released from BC. Microbial population for the control was 80 CFUs where it was increased by 41 and 33% for 2% amended nitric acid and sulfuric acid modified BC pots respectively. Highest plant growth parameters such as root length, leaf height and total fresh (wet) and dry weight were observed from 2% amended modified BC. The obtained biomass yield in the control was 33 g and a 30% increment was observed upon 2% nitric acid modified BC amended pots. In a comparison between 2% and 5% amendments, total fresh weight of 31 g was observed by 2% amended pots where the yield was as low as 12 g from 5% amended pots. Also, the control plants yielded a 33 g weight of biomass which was lowered up to 11 g with 5% amendments. Hence, it can be concluded that 2% amendment has favored the overall plant growth parameters where 5% amendment has slowed the growth rate. Overall, a clear growth can be seen in biomass yield and total fresh weight going from two weeks to one month.

Keywords

Tea-waste biochar, plant growth, microbial population, modified Biochar, direct effect